Company valuation in thin markets: how does CAPM perform?

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Summary

Research questions:	How does *thin trading* affect CAPM´s valuation of a company? What are alternatives in case standard CAPM does not work?
Methods:	A simulation approach to beta estimation in thin markets is used to analyze typical biases and some remedies.
Results:	Deficiencies of applying CAPM in the context of thin markets are revealed. It is shown that some of them can be reduced, while others cannot.
Structure of the article:	1. Introduction; 2. Standard valuation in liquid markets; 3. Non-standard valuation in thin markets; 4. Summary; 5. About the authors

1. Introduction

Professional investors routinely use a Capital Asset Pricing Model (CAPM) – based procedure for the valuation of companies in two steps: (1) first, a financial planning model will generate the expected stream of cash flows, and then (2) today´s value of this stream will be estimated through the use of a standard discounting procedure in order to specify its present value (PV). The discount rate employed is called "opportunity cost of capital", or "cost of capital" for short. CAPM´s elegance lies in the fact that it employs a market price for risk to arrive at this number, is both easy to implement and widely accepted. From an empirical perspective, it is probably the most heavily tested proposition in all of business and economics research.

The relevance of "cost of capital" in company valuation is obvious: the larger this number, the lower the value of the given company will be. It can be interpreted as a number which accounts for the investors´ appetite for return given a specific level of risk that they attribute to this type company. In this sense, cost of capital reflects investors´ preferences for risk and return simultaneously.

One of the major data inputs needed to apply CAPM is historical information on the company´s share prices. While this type of information is readily available in liquid markets, this is not the case in illiquid, sometimes called "thin" markets. These markets are characterized by periods without any trading activity as well as erratic price behavior.

In this paper we will therefore try to get a deeper understanding of how share price information in thin markets affects cost of capital estimation through CAPM. This will be done in two steps: First, we demonstrate standard CAPM and its use in company valuation using a very concise, simple numerical example. We then discuss the impact of thin trading on CAPM´s parameters with a different numerical example and show some remedies suggested to cure potential problem areas.

2. Standard valuation in liquid markets

2.1. Numerical Example

Let our valuation be based on a financial plan covering (2012, …, 2015) as well as the assumption that the numbers on the planning horizon (Year 2015) will persist indefinitely (see table 1).

Table 1:
Financial Plan, numerical example

Year	2012	2013	2014	2015 ff.
Net Profit	85	86	87	87
+ Interest Expense	13	11	10	10
+ Depreciation	5	5	5	5
- Capital Expenditure	-10	-10	-10	-10
+/- Changes in Working Capital	0	0	0	0
= Operating Profit (EBIT)	94	96	97	99
- Tax Shield (20%)	-2	-2	-2	-2
= Free Cash Flow	90	90	90	90
PV(Cash Flow @ 9%)	83	76	69	772
NPV (Cash Flow @ 9%) Value of the Company	**1,000**			

In this example, the value of the company (NPV) is $1,000. We get this by discounting the estimated future cash flow with a rate of return that is required by the investor for a business that is similar to this one ("an identical opportunity").

The discounting procedure works like this:

NPV = $92/1.09^1 + 94/1.09^2 + 95/1.09^3 + (97/.09)/ 1.09^3$ = 83 + 76 +69 +772 = 1,000

Now the interesting question is: what is an adequate required return for this company? Is it really 9% or should it be something else?

CAPM´s answer to this question is Equation 1, stating that the required return r on some stock i is the sum of the risk free interest rate r_f plus a risk premium $(E[r_M] - r_f)$ which consists of the excess return of the entire market's risky securities r_M over riskless ones times a company specific beta.

Equation 1:
Capital Costs according to CAPM

$$E[r_i] = r_f + (E[r_M] - r_f)\beta_i$$

Beta can be interpreted as the sensitivity of the company´s securities to changes in overall market prices. As such, it is a measure of company-specific risk which cannot be diversified away.

Let´s take a look at a numerical example involving 30 periods (1 … 30) with 9% average annual return of the stock and a return of the index of 8%.[1] To get i´s beta, we run a standard least squares regression on the equation

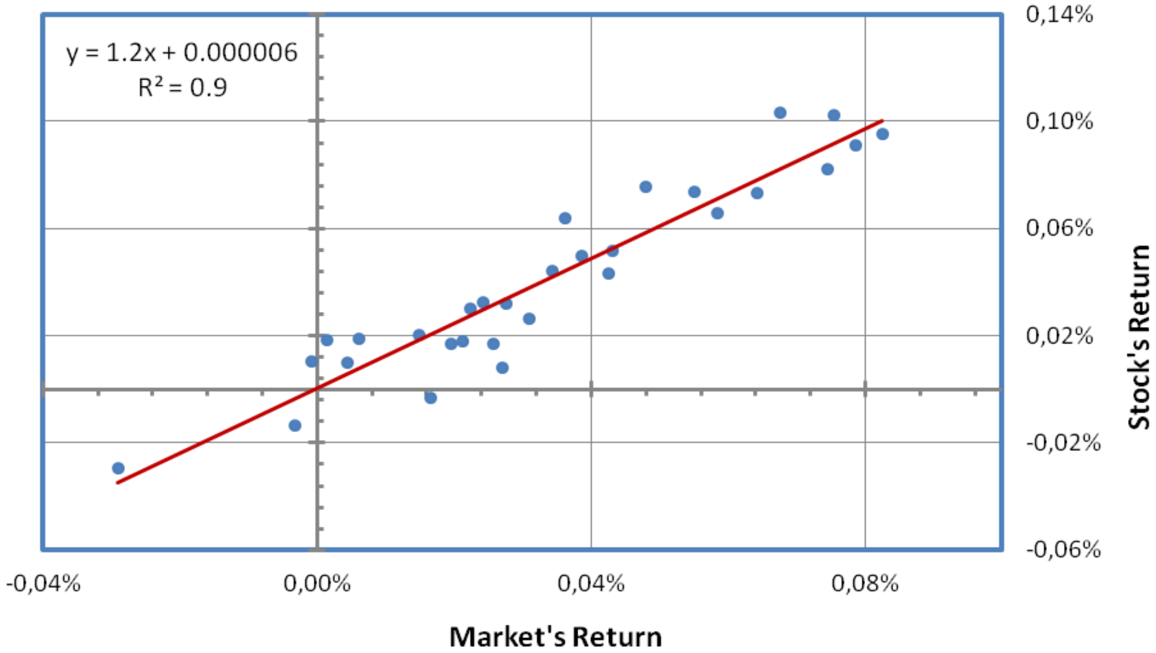
Equation 2:
Estimating beta

$$r_i - r_f = \alpha_i + \beta_i \left(r_m - r_f\right) + \varepsilon_i$$

Equation 2 is simply a convenient re-statement of the standard CAPM-equation based on historical data for the expected return of a security. It consists of the risk-free rate plus a risk premium for security *i* that is made up of the excess return times β_i as a scaling factor.

The result of our estimation procedure as well as a graphical representation of our dataset can be seen in Figure 1. It shows that our company's beta is estimated to be 1.2, making it slightly more volatile than the market itself. Whenever the market goes up or down by 1, our stock will move on average by 1.2.

Figure 1:
Market´s Return and Stock´s Return



Assuming a risk free interest rate of 3%, we can compute the expected return (i.e. cost of capital) for our company by employing Equation 1:

$$E[r_i] = r_f + \left(E[r_M] - r_f\right) \cdot \beta_i$$

$$= 3\% + (8\% - 3\%) \cdot 1.2 = 9\%.$$

For our data set, the standard CAPM-procedure estimates capital costs of 9% which in turn leads to a company value of $1,000 as shown in the example above.

[1] See Appendix A

2.2. Quality of the valuation procedure

In order to be able to use the above standard procedure for company valuation one has to make sure that the beta estimate is of high quality. Statistics traditionally uses two indicators to judge the quality of such regression results:

(1) First, a check for the significance of beta is performed in an attempt to decide whether it is different from Zero, because if it were, it would be safe to say that the market has an influence on the company´s return. In addition to testing this hypothesis, we use statistical techniques to compute numerical ranges (intervals) within which the true beta lies with a given probability of, let´s say, 95%. The narrower these ranges, the more confident we would be about our beta estimate.

(2) Second, the overall quality of the linear modeling approach is summarized by its coefficient of determination (R^2) which can be interpreted as the percentage of share price movements which is explained through the use of our (CAP-) model. We compute R^2 in this fashion: $R^2 = r_{i,M}^2 = \frac{Cov(i,M)^2}{\sigma_i^2 \sigma_M^2}$.

It is a matter of judgment and experience to decide whether a specific R^2 will be considered as being high or low. This depends on the circumstances of the specific valuation problem.

In comparison, R^2 seems to be the more important quality indicator, because a beta near Zero seems intuitively possible and does not contradict the model´s assumptions. It merely describes a security which is not affected by overall market conditions and has a level of risk that is comparable to the riskfree rate.

We can therefore distinguish four cases:

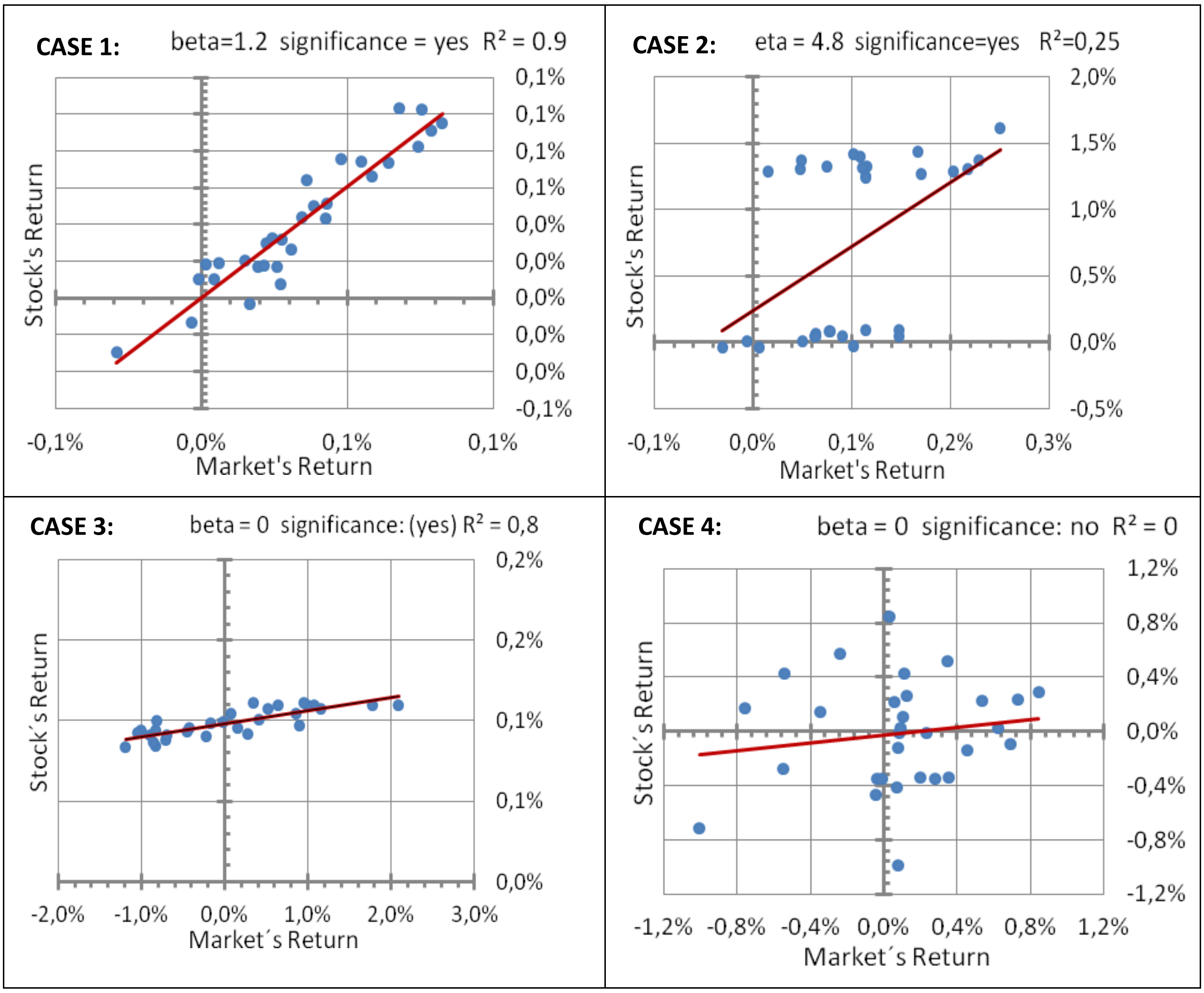
Market affects company´s return (ß is significantly different from Zero)	Model is good (high R2)	
	Yes	No
Yes	1 (Yes CAPM) $914 - $1,091	2 (no CAPM) $334
No	3 (Yes CAPM) $2,951	4 (no CAPM) -

Our numerical example above represents case 1, because it is highly likely that our beta of 1.2 is truly different from Zero $(p \approx 0)$ and there is 95% chance that the true beta will be somewhere between 1.05 (lower bound) and 1.37 (upper bound). Our linear (CAP)-model explains 90% of the variation in the data. Experience (some arbitrariness, too) tells us that this number can be considered quite high.

Usage of these bounds for valuation purposes in our numerical example would span a range of company values between $914 and $1,091. In summary we conclude that in this example the usage of CAPM leads to a pretty confident estimate of capital costs of 9%.

Let´s complete the picture by looking at graphical representations of datasets representing all four cases (1) – (4).

Figure 2:
Quality of Beta Estimation-Cases



In Figure 2 returns according to case (2) are shown where a high Beta of 4.8 is significantly different from zero. But the R^2 of 0.25 seems to be pretty low and should be rejected. Thus using a beta of 4.8 (company value: $334) cannot be justified, our beta can be viewed as a random number.

In case (3) beta is pretty close to zero (0.009) and the R^2 of 0.82 seems high. Although beta's significance level states that it is still different from zero (confidence limits: 0.007-0.01) there is no doubt that the stock's return involves an extremely low level of systematic risk. From our point of view, small betas (even zero) may be used in valuation procedures as long as R^2 is high (R^2 not defined if beta is exactly zero). Unfortunately, this is not the case in (4) and we suggest using some other valuation method.

3. Non-standard valuation in thin markets

2.3. Numerical Example

Thin markets are characterized by low turnover as well as the fact that share price information is not readily available at all times. This happens very often in situations involving majority shareholders who do not trade at all times ("Thin trading"). One of the motivations for them to do so could be attempts to influence company values in squeeze-out environments.

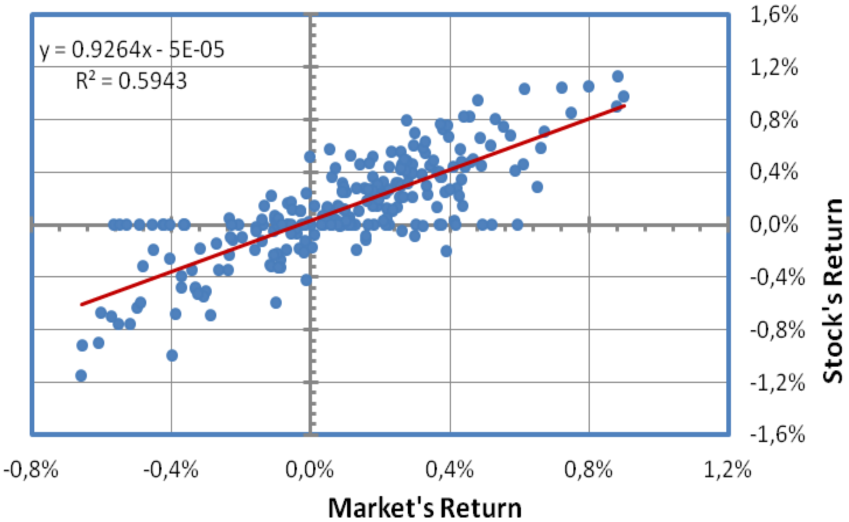
It seems intuitively clear that the arrival of new pieces of information in these thin markets may lead to non-synchronous trading behavior (probably lagged trading) because fewer people trade and may not be quite as well informed, active and quick as the many people participating in more liquid markets.

How would this affect CAPM? Well, if there is a time lag between the arrival of information and the trade, the relationship between market index and the stock price will get weaker and beta will be smaller, which in turn would lead to a biased estimate of company value that is on the high side of the true company value.

Also, usage of our standard procedure to compute returns would generate quite a few periods with a return of 0%, because stock prices do not change in such periods. Clearly, our beta estimates can be expected to be biased, but the good news is that R^2 will be low and we will notice the problem.

We obtain a numerical representation of such a situation by simulating 250 periods´ returns including 70 with no trade.[2]

Figure 3:
Market´s Return and Stock´s Return when Thin Trading is present



Based on our simulation settings, beta should be about 1.2 and R^2 about 0.8 if the data wouldn't be affected by thin trading's zero returns. But taking periods of no trade into account as zero returns will reduce both beta (0.9) and R^2 (0.6). In our example thin trading leads to an increase in company value by 20% ($1,200 up from $1,000).

In the literature we find suggestions on how to adjust your data in a situation like this. We will briefly cover four of these.

2.4. Adjustments

Dimson and Marsh (1983) suggest to simply exclude those periods from the analysis in which we do not observe trades or price quotations. Their approach produces a so-called *Trade-to-Trade Beta* (TT-Beta), because Zero-returns due to no trades will be ignored.

In this case, returns will be based on differing interval lengths and we typically assume longer periods to exhibit increased variance of returns. Also, we can expect to see some degree of heteroskedasticity that would

[2] See Appendix B

systematically distort our error terms as well as destroy the usefulness of our tests of significance. Dimson and Marsh (1983) suggest this adjustment with d_t as the length of the interval:

$$\frac{R_{i,t}}{\sqrt{d_t}} = \frac{\alpha}{\sqrt{d_t}} + \beta_{i,TT} \cdot \frac{R_{M,t}}{\sqrt{d_t}} + \varepsilon_{i,t}.$$

Scholes and Williams (1977) suggest the elimination of effects due to asynchronous trading behavior on the Beta-estimate by leading or lagging share prices (SW-BETA) in this fashion

$$\hat{\beta}_{SW} = \frac{\beta_{i,-1} + \beta_{i,0} + \beta_{i,1}}{1 + 2\rho_1}$$

where

$\beta_{i,-1}$ Lag-Beta-estimator of $R_{i,t}$ and $R_{M,t-1}$,

$\beta_{i,0}$ No lagged Beta-estimator of $R_{i,t}$ and $R_{M,t}$,

$\beta_{i,+1}$ Lead-Beta-estimator of $R_{i,t}$ and $R_{M,t+1}$,

ρ_1 Autocorrelation of market return, lag of one period.

All the betas above will be estimated using familiar OLS-regression methodology, the term in the denominator takes care of the autocorrelation of returns of degree one, i.e. one period. It has a value of $\hat{\beta}_{SW} = \beta_{i,0}$ in case there are no lags.

In this sense, SW´s approach is more general than our standard CAPM, as it is a versatile means to correct for differences in the degrees of liquidity of the market and individual stocks. For autocorrelations of higher degrees we have for degree two

$$\hat{\beta}_{SWFR} = \frac{\beta_{i,-2} + \beta_{i,-1} + \beta_{i,0} + \beta_{i,+1} + \beta_{i,+2}}{1 + 2\rho_1 + 2\rho_2},$$

or in the most general case for higher degrees

$$\beta_{i,p,q} = \frac{\beta_i + \sum_{p=1}^{P} \beta_{i,-p} + \sum_{q=1}^{Q} \beta_{i,q}}{1 + \sum_{p=1}^{P} \rho(r_{M,t}; r_{M,t-p}) + \sum_{q=1}^{Q} \rho(r_{M,t}; r_{M,t+q})}$$

with *p* as the number of Lag Betas (slower than the index)and *q* as the number of Lead-Betas (SWFR-beta).

The degree of autocorrelation to be used can be specified exogenously by the maximum length of any non-trading period observed or computed by some closer inspection of the data via correlation analysis.

Instead of running many simple regressions that would estimate individual lead-betas and lag-betas we may also follow Dimson´s suggestion to run a multiple regression of this form

$$R_{i,t} = \alpha_i + \sum_{k=-m}^{m} \beta_{i+k} R_{M,t+k} + \varepsilon_{i,t}.$$

and exclude those betas that we find to be insignificant. Fowler and Rorke (1983) have shown that this estimator is inconsistent, though.

To improve forecasting efficiency, Blume suggests a simple adjustment based on the observation that company betas converge to 1 over time:

$$\hat{\beta}_{Blume} = \frac{2}{3} \cdot \hat{\beta} + \frac{1}{3} \cdot 1.$$

Vasicek, on the other hand, tries to account for the quality of beta-estimates and uses the standard error of the estimations as a weighting scheme:

$$\hat{\beta}_{Vasicek} = \hat{\beta} \cdot \frac{\sigma^2(\beta)}{\sigma^2(\beta) + \sigma^2\left(\hat{\beta}\right)} + 1 \cdot \frac{\sigma^2\left(\hat{\beta}\right)}{\sigma^2(\beta) + \sigma^2\left(\hat{\beta}\right)}.$$

where $\sigma^2(\beta)$ is the regression's total variance like $\sigma^2(\beta) = \frac{1}{n-2}\sum_{i=1}^{n} \varepsilon_i^2$ and $\sigma^2\left(\hat{\beta}\right)$ denotes the variance of the sample $\sigma^2\left(\hat{\beta}\right) = \frac{\sigma^2(\beta)}{\sigma_M^2}$.

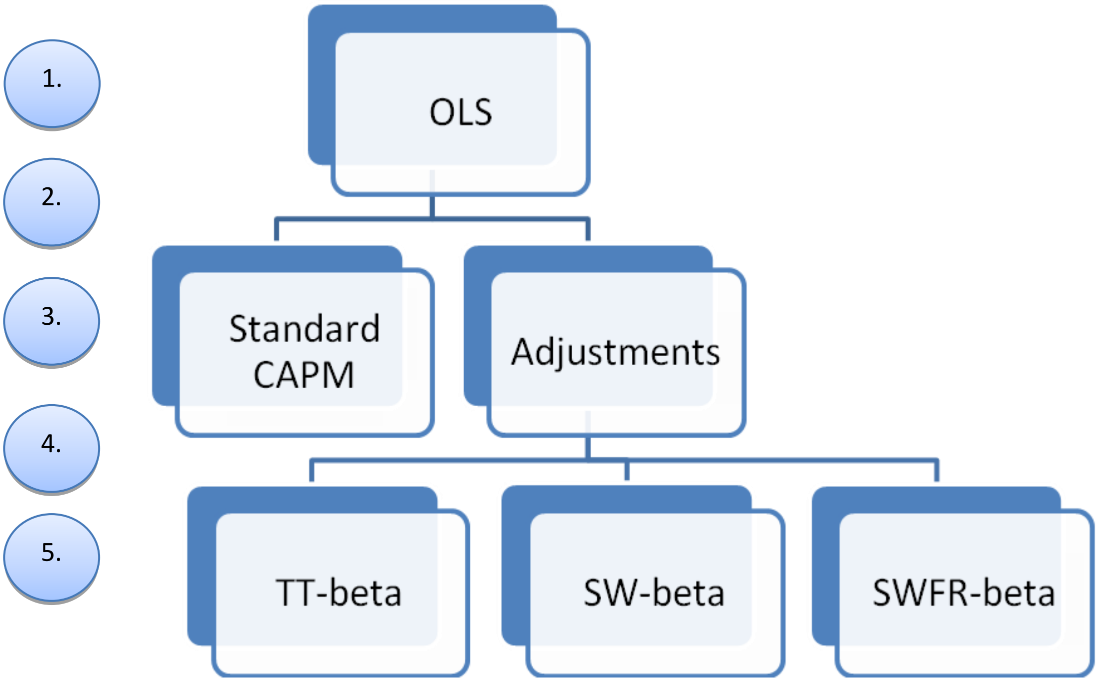
The less precise these estimates are, the closer the weight will be to a value of one. Vasicek´s approach seems computationally more tedious, but intuitively appealing.

4. Summary

In environments with thin trading we have a choice of using standard CAPM, non-standard CAPM, or no CAPM at all to value a company. In this paper, we propose the following procedure:

1. Perform OLS on the standard CAPM-equation to compute the stock´s expected return
2. Decide, whether R^2 is high or low
3. If R^2 is high, use standard CAPM, if it is low, try to correct this by adjusting data
4. Decide on adequate adjustment method by performing autocorrelation analysis
5. In case R^2 is high after data adjustments, use CAPM on manipulated data
6. In case R^2 is low after data adjustments, do not use CAPM.

Figure 4:
Beta Estimation Methodology when Thin Trading is present



We present a numerical example with the following results:

1. OLS results: beta = 0.9, R^2 = 0.6
2. Decision based on judgment and experience: R^2 is low
3. Apply non-standard CAPM
4. Decision based on autocorrelation analysis: apply TT-Beta (no correlation)
5. R2 is high after data adjustments: beta = 1.3, R^2 = 0.86: use CAPM on adjusted data.

The resulting company value is $948 (true value: $ 1,000). In comparison to standard procedures (company value: $ 1,200) the applied method improved the estimation results of beta.

5. About the authors

Holger Hinz is the Chair of Business Finance at the University of Flensburg, Germany. He holds degrees from Indiana University (Operations and Systems Management) and Kiel University (Accounting and Finance) and is currently director of Flensburg University's International Institute of Management. His research interests include financial modeling, especially FOREX- and other types of price risk-related exposure. In addition, he has worked on financial planning, mezzanine finance, real options, financial literacy, as well as some research activities of local interest to the German-Danish cross-border region.

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Appendix A

Table 1:

Dataset 1

Period	Stock´s Return	Market´s Return	**Period**	Stock´s Return	Market´s Return
1	0,08%	0,07%	**16**	0,04%	0,04%
2	0,01%	0,00%	**17**	0,02%	0,01%
3	0,04%	0,03%	**18**	0,02%	0,02%
4	0,03%	0,02%	**19**	-0,03%	-0,03%
5	0,08%	0,05%	**20**	0,10%	0,08%
6	0,06%	0,04%	**21**	0,03%	0,03%
7	0,07%	0,05%	**22**	0,05%	0,04%
8	0,05%	0,04%	**23**	0,02%	0,00%
9	0,02%	0,03%	**24**	0,10%	0,08%
10	0,02%	0,02%	**25**	0,09%	0,08%
11	0,07%	0,06%	**26**	0,00%	0,02%
12	0,10%	0,07%	**27**	0,07%	0,06%
13	0,01%	0,00%	**28**	-0,01%	0,00%
14	0,03%	0,03%	**29**	0,01%	0,03%
15	0,02%	0,01%	**30**	0,03%	0,02%

Appendix B

Table 2:

Dataset 2

Period	Stock's Return	Market's Return	**Period**	Stock's Return	Market's Return
1	0,05%	0,24%	**126**	0,61%	0,44%
2	-0,17%	0,04%	**127**	-0,12%	-0,03%
3	-0,38%	-0,42%	**128**	-0,13%	-0,06%
4	0,00%	0,01%	**129**	-0,23%	-0,07%
5	0,50%	0,38%	**130**	0,63%	0,50%
6	0,00%	-0,43%	**131**	-0,18%	-0,08%
7	0,00%	0,57%	**132**	0,17%	0,01%
8	-0,17%	-0,26%	**133**	-0,25%	-0,09%
9	-0,72%	-0,30%	**134**	0,86%	0,40%
10	0,00%	-0,23%	**135**	0,39%	0,24%
11	0,00%	0,07%	**136**	0,71%	0,60%
12	0,20%	0,30%	**137**	0,00%	0,13%
13	-0,02%	0,24%	**138**	-0,31%	-0,38%
14	0,00%	-0,02%	**139**	0,00%	0,26%
15	0,00%	-0,06%	**140**	0,16%	0,22%
16	0,00%	0,06%	**141**	0,00%	-0,04%
17	0,02%	-0,20%	**142**	-0,10%	-0,05%
18	0,51%	0,34%	**143**	0,40%	0,47%
19	0,37%	0,26%	**144**	0,00%	0,47%
20	0,77%	0,58%	**145**	0,00%	0,22%
21	-0,68%	-0,38%	**146**	0,02%	0,19%
22	-1,37%	-1,04%	**147**	0,31%	0,34%
23	-0,23%	0,06%	**148**	0,00%	0,44%
24	-0,19%	-0,13%	**149**	0,22%	0,22%
25	-0,78%	-0,59%	**150**	0,50%	0,31%
26	0,64%	0,50%	**151**	-0,88%	-0,46%
27	0,00%	-0,25%	**152**	-0,35%	-0,26%
28	0,36%	0,27%	**153**	0,00%	0,15%
29	0,00%	0,37%	**154**	0,00%	0,22%
30	0,04%	-0,11%	**155**	0,36%	0,33%
31	0,00%	-0,61%	**156**	-0,31%	-0,29%
32	0,57%	0,72%	**157**	0,56%	0,26%
33	0,27%	0,04%	**158**	-0,10%	-0,04%
34	0,00%	-0,43%	**159**	-0,33%	-0,23%
35	0,30%	0,27%	**160**	0,16%	0,11%
36	-0,98%	-0,47%	**161**	0,00%	0,40%
37	-0,45%	-0,14%	**162**	-0,25%	-0,12%
38	0,06%	0,11%	**163**	-0,12%	-0,13%
39	0,45%	0,31%	**164**	0,00%	0,32%

40	0,05%	0,37%	**165**	0,00%	-0,16%
41	0,88%	0,39%	**166**	-0,21%	-0,07%
42	-0,12%	-0,14%	**167**	0,27%	-0,10%
43	0,22%	0,15%	**168**	-0,36%	-0,05%
44	0,00%	0,17%	**169**	0,00%	0,18%
45	0,29%	0,41%	**170**	-0,95%	-0,54%
46	-0,10%	-0,19%	**171**	0,21%	0,27%
47	-0,32%	-0,21%	**172**	-0,25%	-0,02%
48	-0,36%	-0,27%	**173**	0,20%	0,12%
49	-0,27%	-0,03%	**174**	0,17%	0,12%
50	0,25%	0,33%	**175**	0,00%	0,02%
51	0,00%	-0,02%	**176**	0,00%	0,20%
52	0,00%	0,42%	**177**	-0,32%	-0,20%
53	0,00%	-0,29%	**178**	0,00%	0,06%
54	0,25%	0,40%	**179**	-0,22%	-0,09%
55	0,32%	0,16%	**180**	-0,24%	0,05%
56	0,00%	0,28%	**181**	-0,64%	-0,38%
57	-0,71%	-0,40%	**182**	1,18%	0,87%
58	0,00%	-0,24%	**183**	0,00%	-0,05%
59	0,28%	0,39%	**184**	0,00%	0,12%
60	-0,24%	-0,17%	**185**	0,00%	0,37%
61	-0,60%	-0,40%	**186**	0,00%	-0,16%
62	-0,02%	0,12%	**187**	0,00%	0,08%
63	-0,49%	-0,37%	**188**	0,00%	-0,13%
64	0,79%	0,57%	**189**	0,17%	0,23%
65	0,04%	-0,07%	**190**	0,03%	0,19%
66	0,00%	0,05%	**191**	0,00%	0,29%
67	0,00%	0,32%	**192**	-0,42%	-0,23%
68	0,00%	-0,31%	**193**	0,00%	-0,25%
69	-0,13%	-0,15%	**194**	0,00%	-0,30%
70	0,48%	0,40%	**195**	0,00%	-0,48%
71	0,38%	0,15%	**196**	0,34%	0,36%
72	0,17%	0,29%	**197**	0,14%	0,06%
73	-0,23%	-0,06%	**198**	0,28%	0,37%
74	-0,96%	-0,57%	**199**	0,00%	-0,22%
75	0,10%	0,23%	**200**	0,00%	0,18%
76	0,21%	0,30%	**201**	0,03%	0,02%
77	0,00%	-0,01%	**202**	0,97%	0,58%
78	-0,29%	-0,37%	**203**	-0,09%	0,06%
79	0,17%	0,20%	**204**	0,34%	0,13%
80	0,38%	0,26%	**205**	-0,40%	-0,39%
81	0,43%	0,27%	**206**	0,68%	0,60%
82	1,26%	0,82%	**207**	0,00%	0,39%
83	-0,44%	-0,36%	**208**	0,15%	0,25%
84	0,25%	0,44%	**209**	0,30%	0,32%
85	-0,01%	0,01%	**210**	-0,51%	-0,19%
86	0,04%	-0,08%	**211**	0,08%	0,04%

87	0,26%	0,34%	**212**	0,00%	-0,12%
88	-0,01%	-0,05%	**213**	0,46%	0,18%
89	0,00%	0,21%	**214**	0,05%	0,08%
90	-0,07%	-0,34%	**215**	-0,66%	-0,54%
91	0,00%	-0,12%	**216**	0,00%	0,16%
92	0,00%	0,44%	**217**	0,00%	0,59%
93	0,10%	0,06%	**218**	0,00%	0,37%
94	-0,07%	-0,22%	**219**	0,00%	0,53%
95	0,65%	0,39%	**220**	0,00%	-0,39%
96	-0,09%	-0,07%	**221**	0,00%	-0,46%
97	0,00%	-0,45%	**222**	0,00%	-0,13%
98	0,74%	0,72%	**223**	0,75%	0,40%
99	0,00%	0,17%	**224**	0,14%	-0,06%
100	0,00%	-0,12%	**225**	0,10%	0,04%
101	-0,22%	-0,15%	**226**	0,01%	0,28%
102	0,02%	0,02%	**227**	0,18%	0,22%
103	-0,70%	-0,55%	**228**	-0,21%	0,10%
104	0,07%	-0,05%	**229**	-0,42%	-0,38%
105	-0,40%	-0,07%	**230**	0,38%	0,16%
106	-0,81%	-0,44%	**231**	0,12%	-0,09%
107	0,38%	0,25%	**232**	-0,21%	-0,11%
108	0,85%	0,60%	**233**	0,94%	0,92%
109	0,28%	0,31%	**234**	-0,44%	-0,21%
110	-0,14%	-0,25%	**235**	0,21%	0,09%
111	0,80%	0,63%	**236**	-0,33%	-0,10%
112	0,07%	0,07%	**237**	0,00%	-0,15%
113	0,94%	0,73%	**238**	0,09%	0,01%
114	-0,48%	-0,34%	**239**	0,02%	0,10%
115	0,31%	0,21%	**240**	0,94%	0,57%
116	-0,23%	0,00%	**241**	0,37%	0,30%
117	0,00%	0,16%	**242**	0,19%	0,16%
118	-0,19%	0,04%	**243**	0,00%	-0,23%
119	0,12%	-0,01%	**244**	-0,16%	0,02%
120	0,35%	0,11%	**245**	-0,24%	0,04%
121	0,39%	0,14%	**246**	0,00%	-0,27%
122	0,06%	0,12%	**247**	0,15%	0,09%
123	-0,30%	-0,27%	**248**	-0,66%	-0,50%
124	0,00%	0,22%	**249**	0,00%	0,13%
125	0,00%	-0,29%	**250**	-0,05%	-0,10%